

PATENT ABSTRACTS OF JAPAN

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(71)Applicant : NIKON CORP

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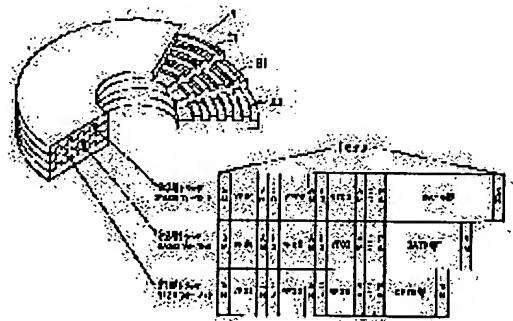
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(54) INFORMATION RECORDING MEDIUM

(57)Abstract:

PROBLEM TO BE SOLVED: To increase memory capacity and to obtain an information recording medium which corresponds to plural numbers of media by forming such a multilayered structure in the information recording medium that information can be recorded into first to N-th layers and by making different formats for respective layers.

SOLUTION: The information recording medium 1 has a three-layer medium in which information is recorded in a first layer A1, second layer B1 and third layer C1. The tracks in the first layer A1 are formed in a 512-byte format sector size, the tracks in the second layer B1 are formed in a 1024-byte format sector size, and the tracks in the third layer C1 are formed in a 2048-byte format sector size. Thereby, the memory capacity can be increased by forming a three-layer information recording medium 1. By making different formats for respective layers, one sheet of the information recording medium 1 has a function corresponding to three sheets of media.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to information record media, such as a magneto-optic disk, an optical disk, and DVD.

[0002]

[Description of the Prior Art] Conventionally, this kind of information record medium is made into the single medium side. That is, the track with which the conventional information record medium consists of a spiral-like slot is formed only in that surface layer, and informational record and playback are performed along the slot of this track.

[0003]

[Problem(s) to be Solved by the Invention] However, in such a conventional information record medium, the track was formed only in the surface layer and the demand of wanting to memorize much information to one information record medium was not able to be met.

[0004] The place which it was made in order that this invention might solve such a technical problem, and is made into that purpose is to offer the information record medium which can give the work which is equivalent to two or more sheets by one medium by changing a format of each class of this information record medium while increasing storage capacity by considering as a multilayer information record medium.

[0005]

[Means for Solving the Problem] in order to attain such a purpose -- the 1st invention (invention concerning claim 1) -- the 1- it considers as the multilayer information record medium equipped with the medium side where information is recorded on the Nth layer, and is made to change a format of each class According to this invention, storage capacity increases by considering as a multilayer information record medium. Moreover, it has the work which is equivalent to two or more sheets by one medium by changing a format of each class. the 2nd invention (invention concerning claim 2) -- the 1- it considers as the multilayer information record medium equipped with the medium side where information is recorded on the Nth layer, and is made to change a format of ***** each class According to this invention, storage capacity increases by considering as a multilayer information record medium. Moreover, it has the work which is equivalent to two or more sheets by one medium by changing a format of ***** each class.

[0006] The 3rd invention (invention concerning claim 3) considers the difference in a format of each class as the difference in sector size in the 1st invention or the 2nd invention. The 4th invention (invention concerning claim 4) considers the difference in a format of each class as the difference in a sector start point in the 1st invention or the 2nd invention. The 5th invention (invention concerning claim 5) considers the difference in a format of each class as the polar difference in a sector mark in the 1st invention or the 2nd invention.

[0007]

[Embodiment of the Invention] Hereafter, this invention is explained to a detail based on the gestalt of operation.

[Gestalt 1 of operation] Drawing 1 is drawing showing the important section of the information record medium in which the gestalt (gestalt 1 of operation) of 1 implementation of this invention is shown. Let this information record medium (disk) 1 be that information record medium of three layers equipped with the 1st layer of A1 and

the medium side where information is recorded on B1 and 3rd layer C1 the 2nd layer. Let the track of A1 be 512-byte format sector size the 1st layer. Let the track of B1 be 1024-byte format sector size the 2nd layer. Let the track of C1 be 2048-byte format sector size the 3rd layer.

[0008] Considering as such a disk 1, i.e., by considering as the information record medium of three layers, storage capacity increases. Moreover, it will have the 1st layer of A1 and the 2nd layer of the work which is equivalent to three sheets by one medium B1 and by changing the 3rd layer of a format of C1.

[0009] in addition -- the gestalt of this operation -- the 1st -- layer A1 -- 512-byte format sector size -- although B1 was made into 1024-byte format sector size and the 2nd layer of 3rd layer C1 was made into 2048-byte format sector size -- the 1st -- layer A1 -- 2048-byte format sector size -- as for the combination of that sector size, it is free in B1 512-byte format sector size, make [layer / 2nd] C1 [layer / 3rd] into 1024-byte format sector size etc. Moreover, although the disk 1 was used as the information record medium of three layers with the gestalt of this operation, it cannot be overemphasized that it is not what is restricted to three layers.

[0010] [Gestalt 2 of operation] Drawing 2 is drawing showing the important section of the information record medium in which the gestalt of other operations of this invention (gestalt 2 of operation) is shown. It considers as the multilayer information record medium like the disk 1 which also explained this disk 2 with the gestalt 1 of operation. however -- this disk 2 -- the -- A2 is represented in drawing 2 (a), the 1st layer of 2nd layer B-2 is represented in drawing 2 (b), and the difference in a format of each class is considered as the difference in a sector start point so that it may be shown.

[0011] That is, for the 1st layer of the recording track initiation sector, by A2, as Sign STA shows, the starting position of a format is made into the inner circumference side. On the other hand, in 2nd layer B-2, as Sign STB shows, the starting position of a format is made into the periphery side for the recording track initiation sector.

[0012] [Gestalt 3 of operation] Drawing 3 is drawing showing the important section of the information record medium in which the gestalt of other operations of this invention (gestalt 3 of operation) is shown. It considers as the multilayer information record medium like the disk 1 which also explained this disk 3 with the gestalt 1 of operation. However, by this disk 3, the 2nd layer of that 1st layer A3 is considered as the polar difference in the sector mark according the difference in a format of ***** each class to La Stampa at drawing 3 (d), as C3 is represented in drawing 3 R> 3 (b), D3 [layer / 3rd / layer / 4th] is represented in drawing 3 (a) and B3 is shown in drawing 3 (c).

[0013] In 1st layer A3 and 3rd layer C3, the part of sector marks SA and SC is formed as a depression. When a light beam is irradiated at this part for playback, that amount of reflected lights becomes small in the parts SA and SC of a mark, and becomes large in the part (part which has not been dented) which is not a mark. Then, in case binary-ized processing is carried out, when the amount level of reflected lights is large (at the time of the part which is not a mark), it is referred to as "1", and it is referred to as "0" when the amount level of reflected lights is small (when it is the part of a mark).

[0014] On the other hand, the 2nd layer of the part of sector marks SB and SD is formed in convex by B3 and 4th layer D3. When a light beam is irradiated at this part for playback, that amount of reflected lights becomes large in the parts SB and SD of a mark, and becomes small in the part (part which is not convex) which is not a mark. That is, 1st layer A3 and 3rd layer C3, and a polarity become reverse. Then, in case binary-ized processing is carried out, when the amount level of reflected lights is large, it is referred to as "0" (when it is the part of a mark), and it is referred to as "1" when the amount level of reflected lights is small (at the time of the part which is not a mark). Even if the polarity of a mark is reverse by performing such binary-ized processing, the same binary-ized signal can be acquired.

[0015] [Gestalt 4 of operation] Drawing 4 is drawing showing the important section of the information record medium in which the gestalt of other operations of this invention (gestalt 4 of operation) is shown. It considers as the multilayer information record medium like the disk 1 which also explained this disk 4 with the gestalt 1 of operation. However, by this disk 4, that 1st layer A4 is considered as the polar difference in the sector mark non-according the difference in a format of ***** each class to La Stampa at drawing 4 (d), as C4 is represented in drawing 4 (b), D4 [layer / 3rd / layer / 4th] is represented in drawing 4 (a) and 2nd layer B4 is shown in drawing 4 (c). These sector marks are realized by the magneto-optic recording or phase change record.

[0016] A polarity becomes reverse with 1st layer A4 and the regenerative signal acquired from the reflected

light from the sector marks SA and SC of C4 the 3rd layer, and 2nd layer B4 and the regenerative signal acquired from the sector marks SB and SD of D4 the 4th layer. Therefore, in case binary-ized processing is carried out, by C4, 1st layer A4 and when regenerative-signal level is large, it is referred to as "1", and the 3rd layer is set to "0", when small. On the other hand, by D4, 2nd layer B4 and when regenerative-signal level is large, it is referred to as "0", and the 4th layer is set to "1", when small. Even if the polarity of a mark is reverse by performing such binary-ized processing, the same binary-ized signal can be acquired.

[0017] According to the gestalten 3 and 4 of operation, by changing the polarity of the sector mark of ***** each class, even if there is a leakage lump of the information from *****, the ID section can be reproduced correctly.

[0018]

[Effect of the Invention] According to this invention, storage capacity increases by considering as a multilayer information record medium so that clearly from having explained above. Moreover, the work which is equivalent to two or more sheets by one medium can be given now by changing a format of each class. Moreover, if a format of ***** each class is changed and the polarity of a sector mark is changed, even if there is a leakage lump of the information from *****, the ID section can be reproduced correctly.

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MEANS

[Means for Solving the Problem] in order to attain such a purpose -- the 1st invention (invention concerning claim 1) -- the 1- it considers as the multilayer information record medium equipped with the medium side where information is recorded on the Nth layer, and is made to change a format of each class. According to this invention, storage capacity increases by considering as a multilayer information record medium. Moreover, it has the work which is equivalent to two or more sheets by one medium by changing a format of each class. the 2nd invention (invention concerning claim 2) -- the 1- it considers as the multilayer information record medium equipped with the medium side where information is recorded on the Nth layer, and is made to change a format of ***** each class. According to this invention, storage capacity increases by considering as a multilayer information record medium. Moreover, it has the work which is equivalent to two or more sheets by one medium by changing a format of ***** each class.

[0006] The 3rd invention (invention concerning claim 3) considers the difference in a format of each class as the difference in sector size in the 1st invention or the 2nd invention. The 4th invention (invention concerning claim 4) considers the difference in a format of each class as the difference in a sector start point in the 1st invention or the 2nd invention. The 5th invention (invention concerning claim 5) considers the difference in a format of each class as the polar difference in a sector mark in the 1st invention or the 2nd invention.

[0007]

[Embodiment of the Invention] Hereafter, this invention is explained to a detail based on the gestalt of operation.

[Gestalt 1 of operation] Drawing 1 is drawing showing the important section of the information record medium in which the gestalt (gestalt 1 of operation) of 1 implementation of this invention is shown. Let this information record medium (disk) 1 be that information record medium of three layers equipped with the 1st layer of A1 and the medium side where information is recorded on B1 and 3rd layer C1 the 2nd layer. Let the truck of A1 be 512-byte format sector size the 1st layer. Let the truck of B1 be 1024-byte format sector size the 2nd layer. Let the truck of C1 be 2048-byte format sector size the 3rd layer.

[0008] Considering as such a disk 1, i.e., by considering as the information record medium of three layers, storage capacity increases. Moreover, it will have the 1st layer of A1 and the 2nd layer of the work which is equivalent to three sheets by one medium B1 and by changing the 3rd layer of a format of C1.

[0009] in addition -- the gestalt of this operation -- the 1st -- layer A1 -- 512-byte format sector size -- although B1 was made into 1024-byte format sector size and the 2nd layer of 3rd layer C1 was made into 2048-byte format sector size -- the 1st -- layer A1 -- 2048-byte format sector size -- as for the combination of that sector size, it is free in B1 512-byte format sector size, make [layer / 2nd] C1 [layer / 3rd] into 1024-byte format sector size etc. Moreover, although the disk 1 was used as the information record medium of three layers with the gestalt of this operation, it cannot be overemphasized that it is not what is restricted to three layers.

[0010] [Gestalt 2 of operation] Drawing 2 is drawing showing the important section of the information record medium in which the gestalt of other operations of this invention (gestalt 2 of operation) is shown. It considers as the multilayer information record medium like the disk 1 which also explained this disk 2 with the gestalt 1 of operation. however -- this disk 2 -- the -- A2 is represented in drawing 2 (a), the 1st layer of 2nd layer B-2 is represented in drawing 2 (b), and the difference in a format of each class is considered as the difference in a sector start point so that it may be shown.

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[0014] On the other hand, the 2nd layer of the part of sector marks SB and SD is formed in convex by B3 and 4th layer D3. When a light beam is irradiated at this part for playback, that amount of reflected lights becomes large in the parts SB and SD of a mark, and becomes small in the part (part which is not convex) which is not a mark. That is, 1st layer A3 and 3rd layer C3, and a polarity become reverse. Then, in case binary-ized processing is carried out, when the amount level of reflected lights is large, it is referred to as "0" (when it is the part of a mark), and it is referred to as "1" when the amount level of reflected lights is small (at the time of the part which is not a mark). Even if the polarity of a mark is reverse by performing such binary-ized processing, the same binary-ized signal can be acquired.

[0015] [Gestalt 4 of operation] Drawing 4 is drawing showing the important section of the information record medium in which the gestalt of other operations of this invention (gestalt 4 of operation) is shown. It considers as the multilayer information record medium like the disk 1 which also explained this disk 4 with the gestalt 1 of operation. However, by this disk 4, that 1st layer A4 is considered as the polar difference in the sector mark non-according the difference in a format of ***** each class to La Stampa at drawing 4 (d), as C4 is represented in drawing 4 (b), D4 [layer / 3rd / layer / 4th] is represented in drawing 4 (a) and 2nd layer B4 is shown in drawing 4 (c). These sector marks are realized by the magneto-optic recording or phase change record.

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[0017] According to the gestalten 3 and 4 of operation, by changing the polarity of the sector mark of ***** each class, even if there is a leakage lump of the information from ***** , the ID section can be reproduced correctly.

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DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is drawing showing the important section of the information record medium in which the gestalt (gestalt 1 of operation) of 1 operation of this invention is shown.

[Drawing 2] It is drawing showing the important section of the information record medium in which the gestalt of other operations of this invention (gestalt 2 of operation) is shown.

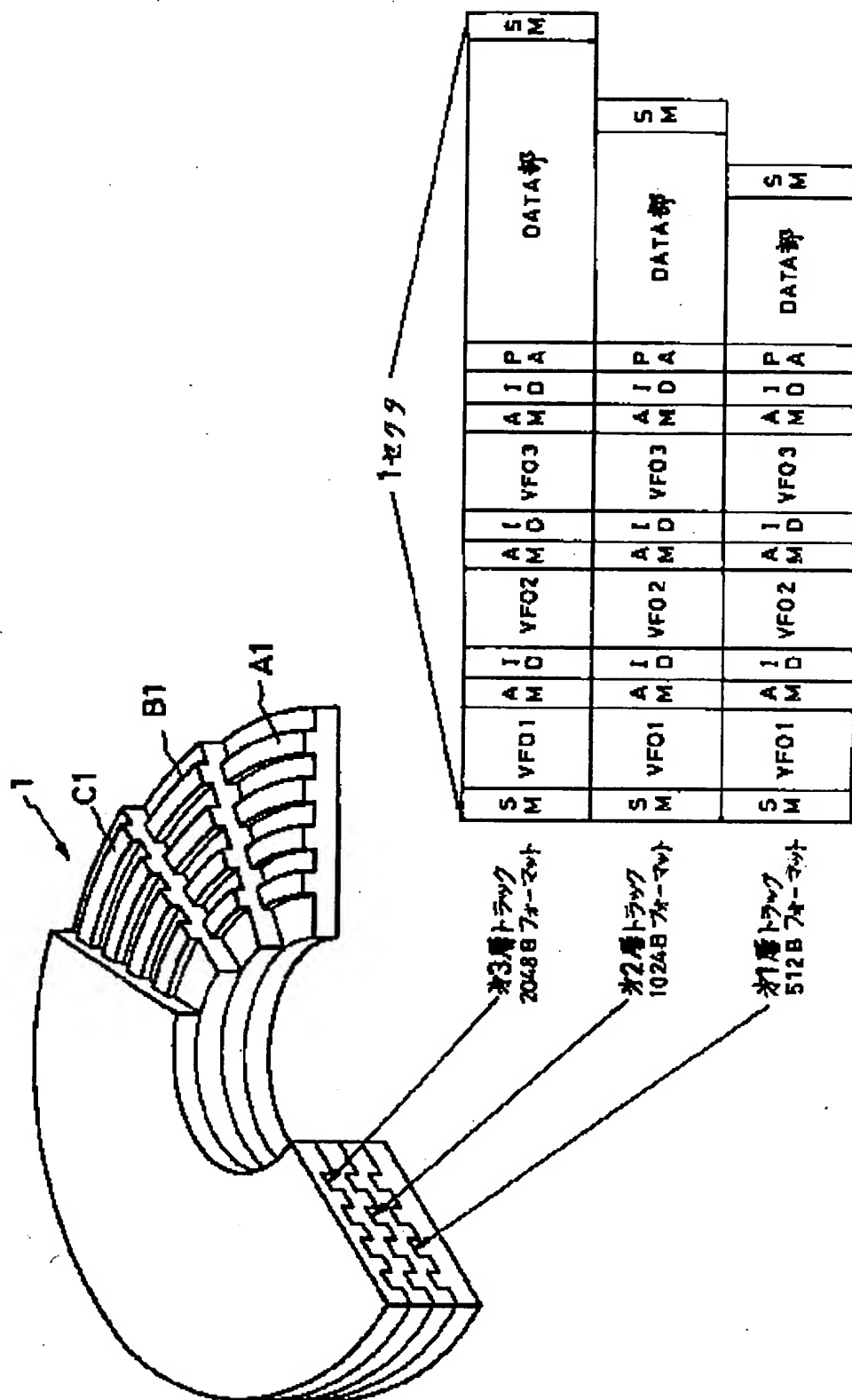
[Drawing 3] It is drawing showing the important section of the information record medium in which the gestalt of other operations of this invention (gestalt 3 of operation) is shown.

[Drawing 4] It is drawing showing the important section of the information record medium in which the gestalt of other operations of this invention (gestalt 4 of operation) is shown.

[Description of Notations]

1, 2, 3, 4 [-- The 3rd layer D3 D4 / -- The 4th layer STA, STB / -- A recording track initiation sector, SA, SB, SC, SD / -- Sector mark.] -- An information record medium (disk), A1 and A2, A3, A4 -- The 1st layer, B1, B-2, B3, B4 -- The 2nd layer, C1, C2, C3, C4

[Translation done.]



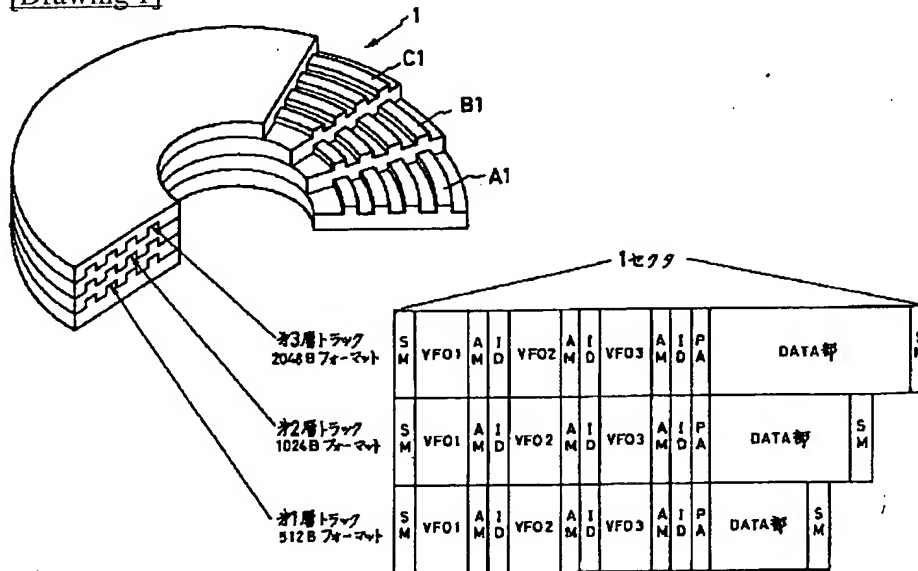
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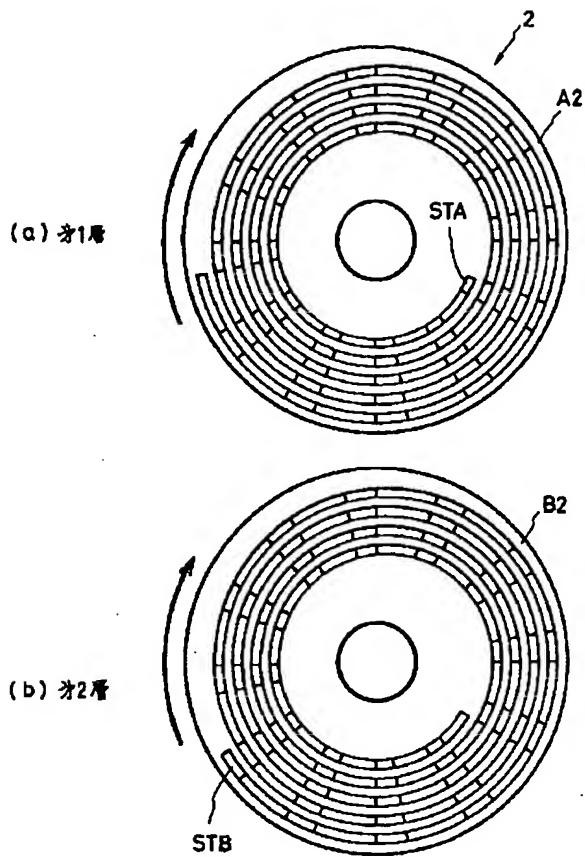
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DRAWINGS

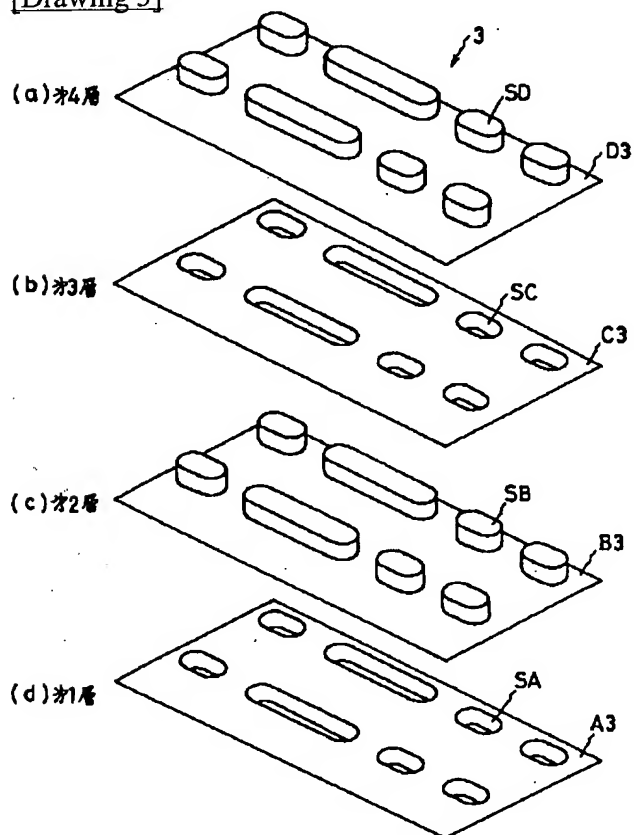
[Drawing 1]



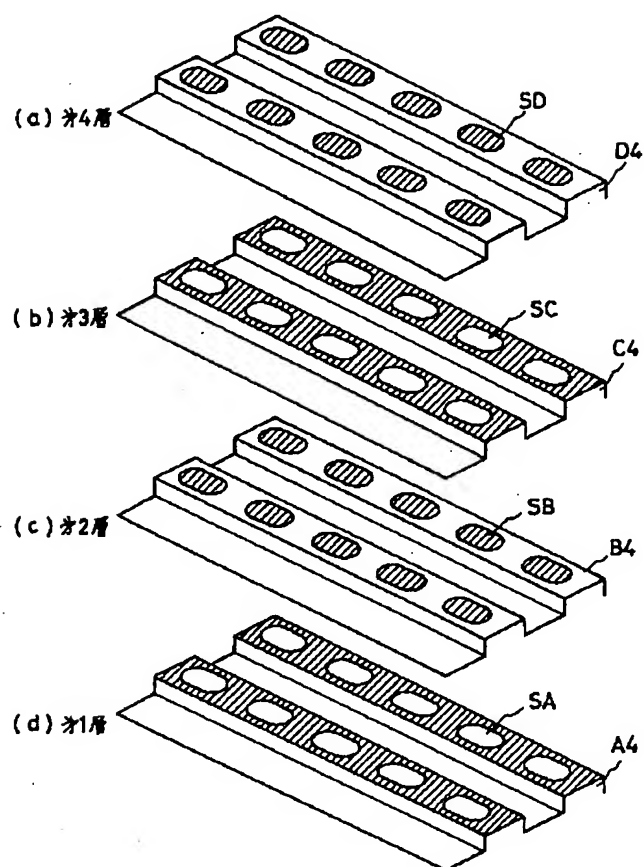
[Drawing 2]



[Drawing 3]



[Drawing 4]



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CLAIMS

[Claim(s)]

[Claim 1] the 1- the information record medium which is a multilayer information record medium equipped with the medium side where information is recorded on the Nth layer, and is characterized by formats of said each class differing.

[Claim 2] the 1- the information record medium which is a multilayer information record medium equipped with the medium side where information is recorded on the Nth layer, and is characterized by formats of ***** each class differing.

[Claim 3] The information record medium characterized by the difference in a format of each class being a difference in sector size in claim 1 or 2.

[Claim 4] The information record medium characterized by the difference in a format of each class being a difference in a sector start point in claim 1 or 2.

[Claim 5] The information record medium which sets to claim 1 or 2 and is characterized by the difference in a format of each class being a polar difference in a sector mark.

[Translation done.]